FCC
SAR
TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

Tablet

ISSUED TO
Evoo Products Company, LLC

2651 Fairfax Avenue Culver City, CA 90232

Tested by: Zong Liyao
Zong Liyao
(Engineer)
Date Oct. 28, 2019

Approved by:
Wei Yanquan
(Chief Engineer)
Date Oct. 28, 2019

Report No.:	BL-SZ1970050-701
EUT Name:	Tablet
Model Name:	EV-A-81-8-2 (refer section 2.4)
Brand Name:	EVOO
FCC ID:	2ATQQEV-A-81-8-2
Test Standard:	FCC 47 CFR Part 2.1093 ANSI C95.1: 1999 IEEE 1528: 2013
Maximum SAR:	Body (1 g): 1.409 W/kg
Test Conclusion:	Pass
Test Date:	Aug. 28, 2019 ~ Sep. 05, 2019
Date of Issue:	Oct. 28, 2019

Block B, 1st FL,Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
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Revision History

Version	Issue Date	Revisions Content
Rev. 01	Oct. 28, 2019	Initial Issue

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1 ADMINSTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation (A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	21℃ to 23℃
Ambient Relative Humidity	37% to 48%
Ambient Pressure	100 to 102KPa

1.4 Announce

(1) The test report reference to the report template version v2.3.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Evoo Products Company, LLC
Address	2651 Fairfax Avenue Culver City, CA 90232

2.2 Manufacturer Information

Manufacturer	HeYuan Vastking Electronic Co.,Ltd.
Address	No.13, Hepu Road, Yuancheng, Heyuan, Guangdong

2.3 Factory Information

Factory	HeYuan Vastking Electronic Co.,Ltd.
Address	No.13, Hepu Road, Yuancheng, Heyuan, Guangdong

2.4 General Description for Equipment under Test (EUT)

EUT Name	Tablet
Model Name Under Test	EV-A-81-8-2
Series Model Name	EV-A-81-8-2-BK, EV-A-81-8-2-BL, EV-A-81-8-2-PK, EV-A-101-3, EV-A-101-3-BK, EV-A-101-3-BL, EV-A-101-3-PK, EV-A-101-3-BKKB, EV-A-101-3-BLKB, EV-A-101-3-PKKB, EV-A-116-1, EV-A-116-1-BK, EV-A-116-1-BL, EV-A-116-1-PK, EV-A-116-1-BKKB, EV-A-116-1-BLKB, EV-A-116-1-PKKB
Description of Model Name Differentiation	1, EV-A-81-8-2, EV-A-81-8-2-BK, EV-A-81-8-2-BL, EV-A-81-8-2-PK means different colors, 2, EV-A-101-3, EV-A-101-3-BK, EV-A-101-3-BL, EV-A-101-3-PK means different colors 3, EV-A-116-1, EV-A-116-1-BK, EV-A-116-1-BL, EV-A-116-1-PK means different colors 4, EV-A-101-3-BKKB, EV-A-101-3-BLKB, EV-A-101-3-PKKB with a keyboard 5, EV-A-116-1-BKKB, EV-A-116-1-BLKB, EV-A-116-1-PKKB with a keyboard 6, EV-A-81-8-2 , EV-A-101-3, EV-A-116-1 have different as below:

Model	Size	Battery Model	Adapter model
EV-A-81-8-2	8 inch	30100105	NA010050020
EV-A-101-3	10.1 inch	3060145-2P	NA010050020
EV-A-116-1	11.5 inch	3082120-2P	SAW20-050-2500UB

Hardware Version	R863H REV: 2.0
Software Version	Android 8.1
Dimensions (Approx.)	N/A

Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery 1 (8 Inches)	
	Brand Name	N/A
	Model No.	30100105
	Serial No.	N/A
	Capacitance	4000mAh
	Rated Voltage	3.7 V
	Limit Charge Voltage	4.2 V
Ancillary Equipment 2	Battery 2 (10.1 Inches)	
	Brand Name	N/A
	Model No.	3060145-2P
	Serial No.	N/A
	Capacitance	6000mAh
	Rated Voltage	3.7 V
	Limit Charge Voltage	4.2 V
Ancillary Equipment 3	Battery 3 (11.5 Inches)	
	Brand Name	N/A
	Model No.	3082120-2P
	Serial No.	N/A
	Capacitance	8000mAh
	Rated Voltage	3.8 V
	Limit Charge Voltage	4.2 V

2.6 Technical Information

Network and Wireless connectivity	Bluetooth 4.2 (BR+EDR+BLE) WIFI 802.11b, 802.11g, 802.11n(HT20/40)

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	2.4G WLAN, Bluetooth	
Frequency Range	802.11b/g /n(HT20/HT40)	2400 ~ 2483.5 MHz
	Bluetooth	2400 ~ 2483.5 MHz
Antenna Type	WLAN: PIFA Antenna Bluetooth: PIFA Antenna	
Hotspot Function	N/A	
Exposure Category	General Population/Uncontrolled exposure	
EUT Stage	Portable Device	
Product	Type	
	☒ Production unit	☐ Identical prototype

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1999	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D01 v06	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
5	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
7	KDB 248227 D01 v02r02	SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters

3.2 Device Category and SAR Limit

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

Table of Exposure Limits:

Body Position	SAR Value (W/Kg)	
	General Population/ Uncontrolled Exposure	Occupational/ Controlled Exposure
Whole-Body SAR (averaged over the entire body)	0.08	0.4
Partial-Body SAR (averaged over any 1 gram of tissue)	1.60	8.0
SAR for hands, wrists, feet and ankles (averaged over any 10 grams of tissue)	4.0	20.0

NOTE:

General Population/Uncontrolled: Locations where there is the exposure of individuals who have no knowledge or control of their exposure. General population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Occupational/Controlled: Locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

3.3 Test Result Summary

3.3.1 Highest SAR (1 g Value)

Band	Maximum Report SAR (W/kg)			Limit (W/kg)
	Body			
2.4G WLAN	8 Inches	10.1 Inches	11.5 Inches	1.6
	1.409	1.078	0.915	
Verdict	Pass			

3.4 Test Uncertainty

3.4.1 Measurement uncertainly evaluation for SAR test

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528 This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10 g)	1g Ui (+-%)	10 g Ui (+-%)	Vi V_{eff}
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	0.7	0.7	1.41	1.41	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	0.7	0.7	2.38	2.38	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient Conditions - Noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related								
Test sample positioning	2.6	N	1	1	1	2.60	2.60	N-1
Device Holder Uncertainty	3.0	N	1	1	1	3.00	3.00	N-1
Output power Variation - SAR drift measurement	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
SAR correction for deviation(in permittivity and conductivity)	2.0	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.03	∞
Liquid conductivity - measurement uncertainty	5.0	N	1	0.78	0.71	3.90	3.55	M
Liquid permittivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Liquid permittivity - measurement uncertainty	5.0	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty	-	RSS		-		10.72	10.56	-
Expanded Uncertainty (95% Confidence interval)	-	k		-		21.45	21.11	-

3.4.2 Measurement uncertainly evaluation for system check

This measurement uncertainty budget is suggested by IEEE 1528. The break down of the individual uncertainties is as follows:

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.30	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	1	1	2.02	2.02	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.56	∞
Probe Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient Conditions - Noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Dipole								
Deviation of experimental dipole	5.5	N	1	1	1	5.00	5.00	∞
Dipole axis to liquid distance	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Power drift	0.5	R	$\sqrt{3}$	1	1	0.29	0.29	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
SAR correction for deviation(in permittivity and conductivity)	2.0	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid conductivity - measurement uncertainty	5.0	N	1	0.78	0.71	3.90	3.55	M
Liquid permittivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Liquid permittivity - measurement uncertainty	5.0	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty	-	RSS		-		10.43	10.25	–
Expanded Uncertainty (95% Confidence interval)	-	k		-		20.86	20.51	–

4 SAR MEASUREMENT SYSTEM

4.1 Definition of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational / controlled exposure limits are higher than the limits for general population /uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\mathrm{SAR} = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right)$$

SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

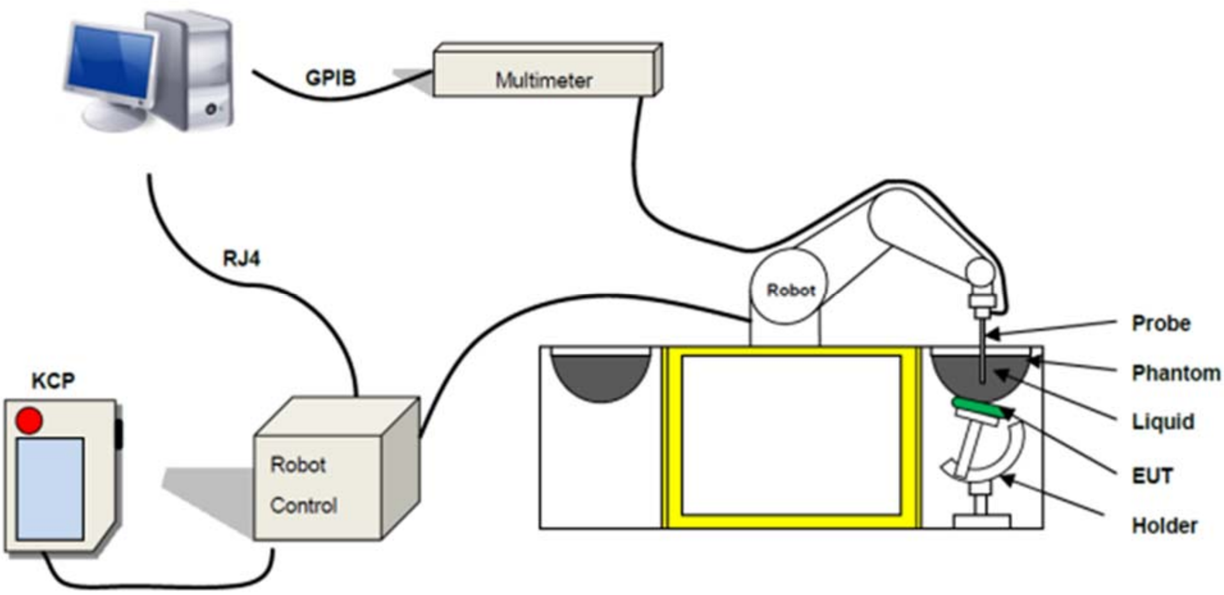
$$\mathrm{SAR} = \frac{\sigma E^2}{\rho}$$

Where: σ is the conductivity of the tissue,

ρ is the mass density of the tissue and E is the RMS electrical field strength.

4.2 SATIMO SAR System

4.2.1 SATIMO SAR System Diagram



These measurements were performed with the automated near-field scanning system OPENSAR from SATIMO.

The system is based on a high precision robot (working range: 850 mm), which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit.

The SAR measurements were conducted with dosimetric probe (manufactured by SATIMO), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in SAR standard with accuracy of better than ±10%. The spherical isotropy was evaluated with the procedure described in SAR standard and found to be better than ±0.25 dB. The phantom used was the SAM Phantom as described in FCC supplement C, IEEE P1528.

4.2.2 Robot

The SATIMO SAR system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA) from KUKA is used. The KUKA robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

4.2.3 E-Field Probe

For the measurements the Specific Dosimetric E-Field Probe SN 34/15 EPGO 265 with following specifications is used

-- Dynamic range: 0.01-100 W/kg

- Tip Diameter : 2.5 mm
- Lower detection limit : 10 mW/kg

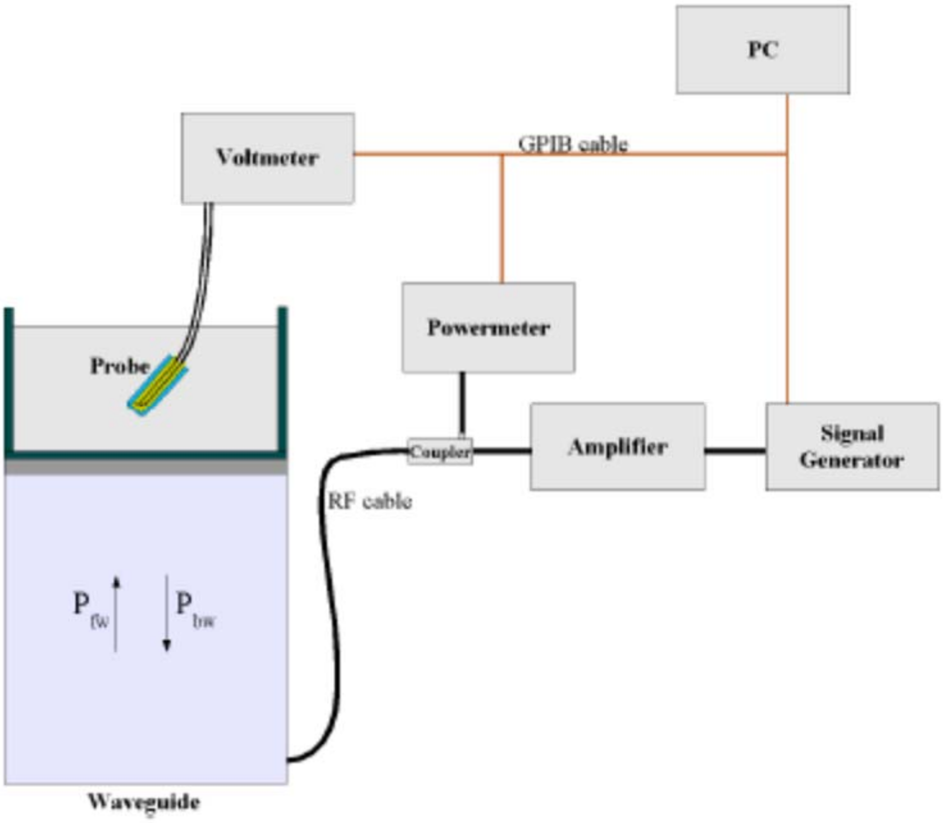
(repeatability better than +/- 1mm)

- Probe linearity: +/- 0.07 dB
- Calibration range: 300 MHz to 6000 MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and surface normal line: less than 30°

E-Field Probe Calibration Process

Probe calibration is realized, in compliance with CENELEC EN 62209-1/-2 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the IEC62209-1/2 annexe technique using reference guide at the five frequencies.



$$SAR = \frac{4(P_{fw} - P_{bw})}{ab\sigma} \cos^2\left(\pi \frac{y}{a}\right) c^{(2\pi/\sigma)}$$

Where :

Pfw	=	Forward Power
Pbw	=	Backward Power
a and b	=	Waveguide Dimensions
ι	=	Skin Depth

Keithley configuration

Rate = Medium; Filter =ON; RDGS=10; FILTER TYPE =MOVING AVERAGE; RANGE AUTO After each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

The calibration factors, CF(N), for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

CF(N)=SAR(N)/Vlin(N) (N=1,2,3)

The linearised output voltage Vlin(N) is obtained from the displayed output voltage V(N) using

Vlin(N)=V(N)*(1+V(N)/DCP(N)) (N=1,2,3)

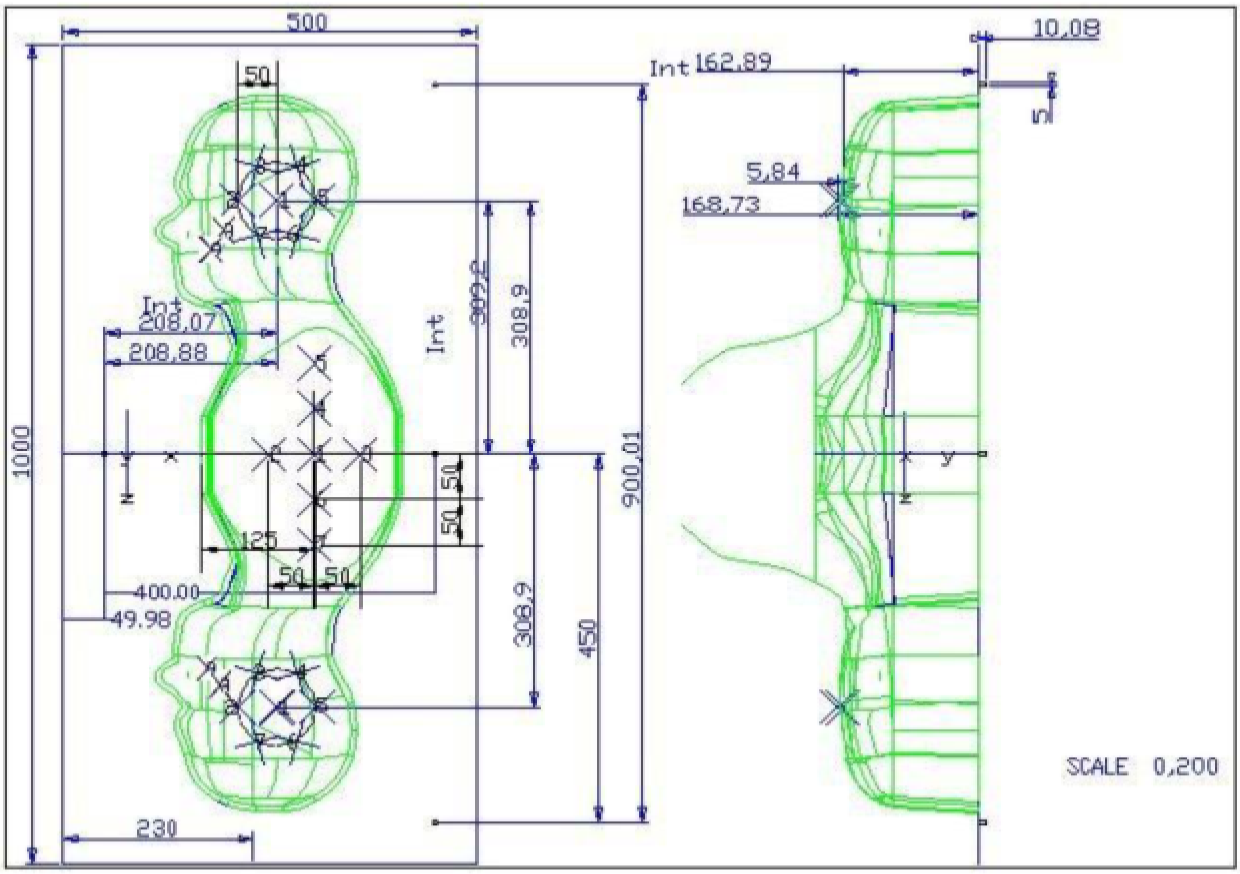
Where the DCP is the diode compression point in mV.

4.2.4 Phantoms

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

Photo of Phantom SN 11/17 SAM133

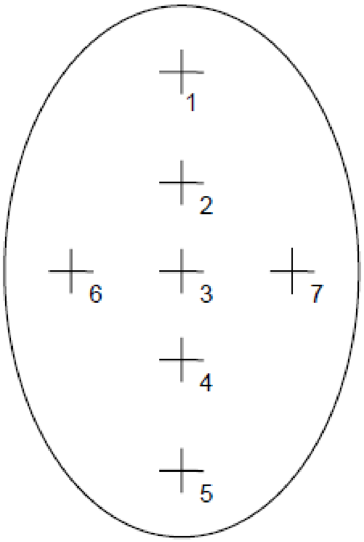
Serial Number	Positionner Material	Permittivity	Loss Tangent
SN 11/17 SAM133	Gelcoat with fiberglass	3.4	0.02



Serial Number	Left Head		Right Head		Flat Part	
SN 11/17 SAM133	2	2.02	2	2.05	1	2.07
	3	2.00	3	2.02	2	2.08
	4	2.01	4	2.02	3	2.10
	5	2.01	5	2.05	4	2.10
	6	2.04	6	2.03	5	2.09
	7	2.01	7	2.04	6	2.09
	8	2.03	8	2.05	7	2.11
	9	2.05	9	2.05	-	-

Photo of Phantom SN 11/17 ELLI42

Serial Number	Positionner Material	Permittivity	Loss Tangent
SN 11/17 ELLI42	Gelcoat with fiberglass	3.4	0.02

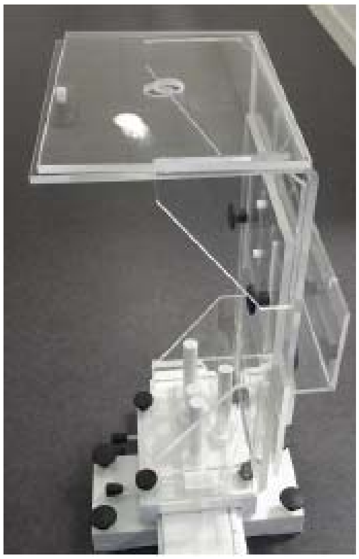


Serial Number	Flat Part	
SN 11/17 ELLI42	1	2.01
	2	2.04
	3	2.04
	4	2.01
	5	2.03
	6	2.06
	7	2.09

4.2.5 Device Holder

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.



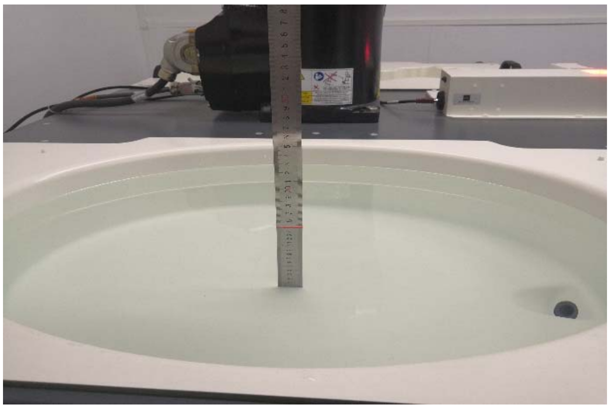


Serial Number	Holder Material	Permittivity	Loss Tangent
SN 11/17 MSH109 (Phone)	Deirin	3.7	0.005
SN 11/17 LSH31 (Laptop)	PMMA	2.9	0.028

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1°.

4.2.6 Simulating Liquid

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5%.

Head Liquid Depth	Body Liquid Depth
	

The following table gives the recipes for tissue simulating liquid and the theoretical Conductivity/Permittivity.

Head (Reference IEEE1528)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ε
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.4	40.0
2450	55.0	0	0	0.1	0	44.9	1.80	39.2
2600	54.9	0	0	0.1	0	45.0	1.96	39.0
Frequency(MHz)	Water (%)	Hexyl Carbitol (%)			Triton X-100 (%)		Conductivity σ (S/m)	Permittivity ε
5200	62.52	17.24			17.24		4.66	36.0
5800	62.52	17.24			17.24		5.27	35.3
Body (From instrument manufacturer)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ε
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0.1	0	31.3	1.95	52.7
2600	68.2	0	0	0.1	0	31.7	2.16	52.5

Frequency(MHz)	Water	DGBE (%)	Salt (%)	Conductivity σ (S/m)	Permittivity ε
5200	78.60	21.40	/	5.54	47.86
5800	78.50	21.40	0.1	6.0	48.20

5 SYSTEM VERIFICATION

5.1 Antenna Port Test Requirement

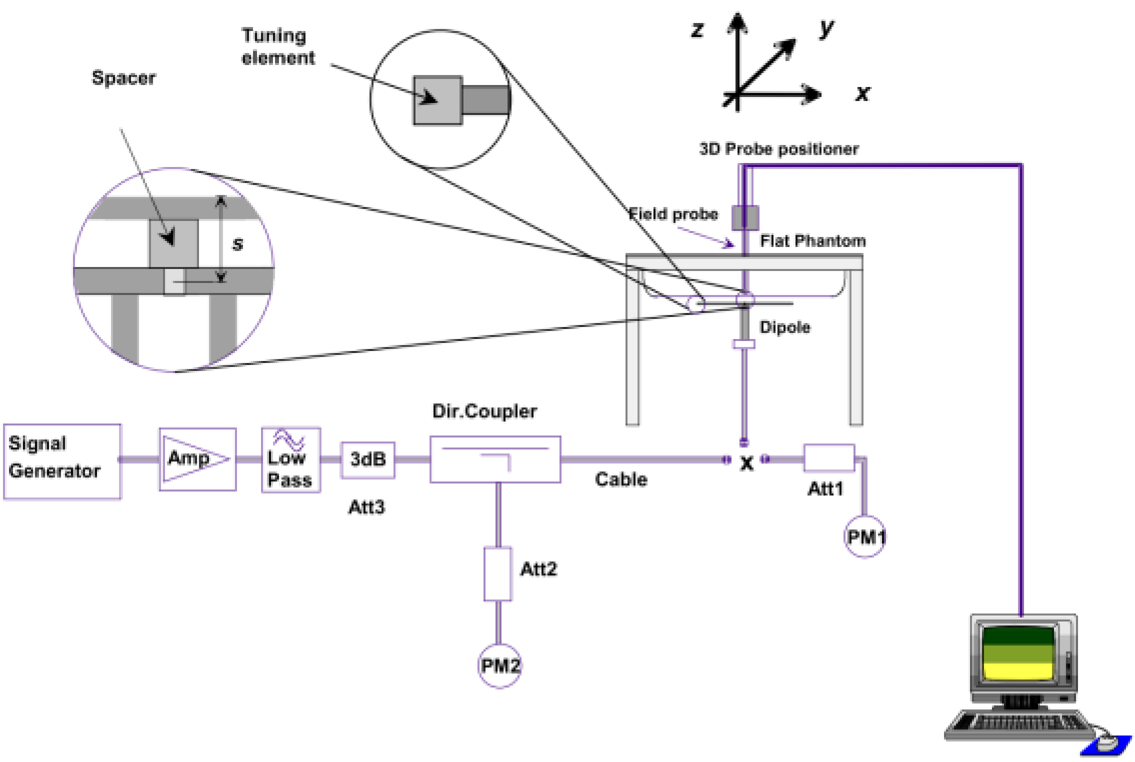
The SATIMO SAR system is equipped with one or more system validation kits. These units together with the predefined measurement procedures within the SATIMO software enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

5.2 Purpose of System Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

5.3 System Check Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



6 EUT TEST POSITION CONFIGURATUONS

6.1 Tablet Exposure Condition

This DUT was tested two different positions. They are back side and bottom edge for 8 Inches tablet, back side and top edge for 10 and 11 Inches tablet, the surface of DUT is touching with phantom 0mm.

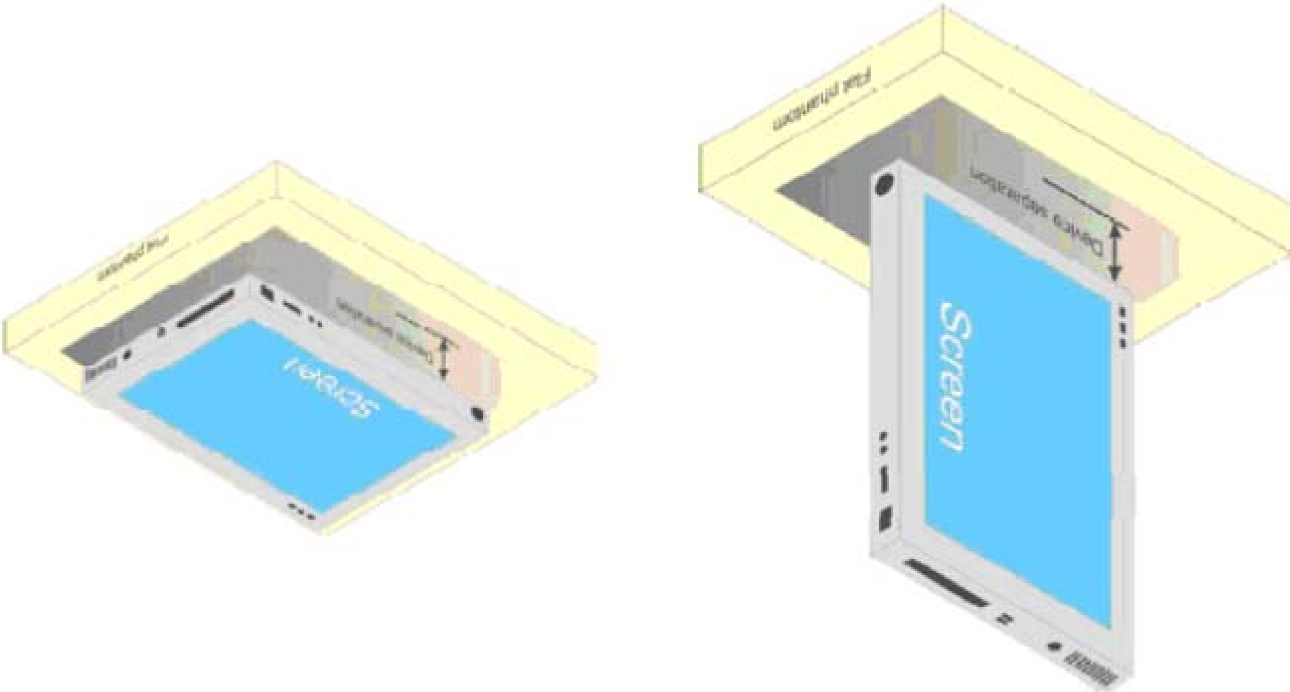
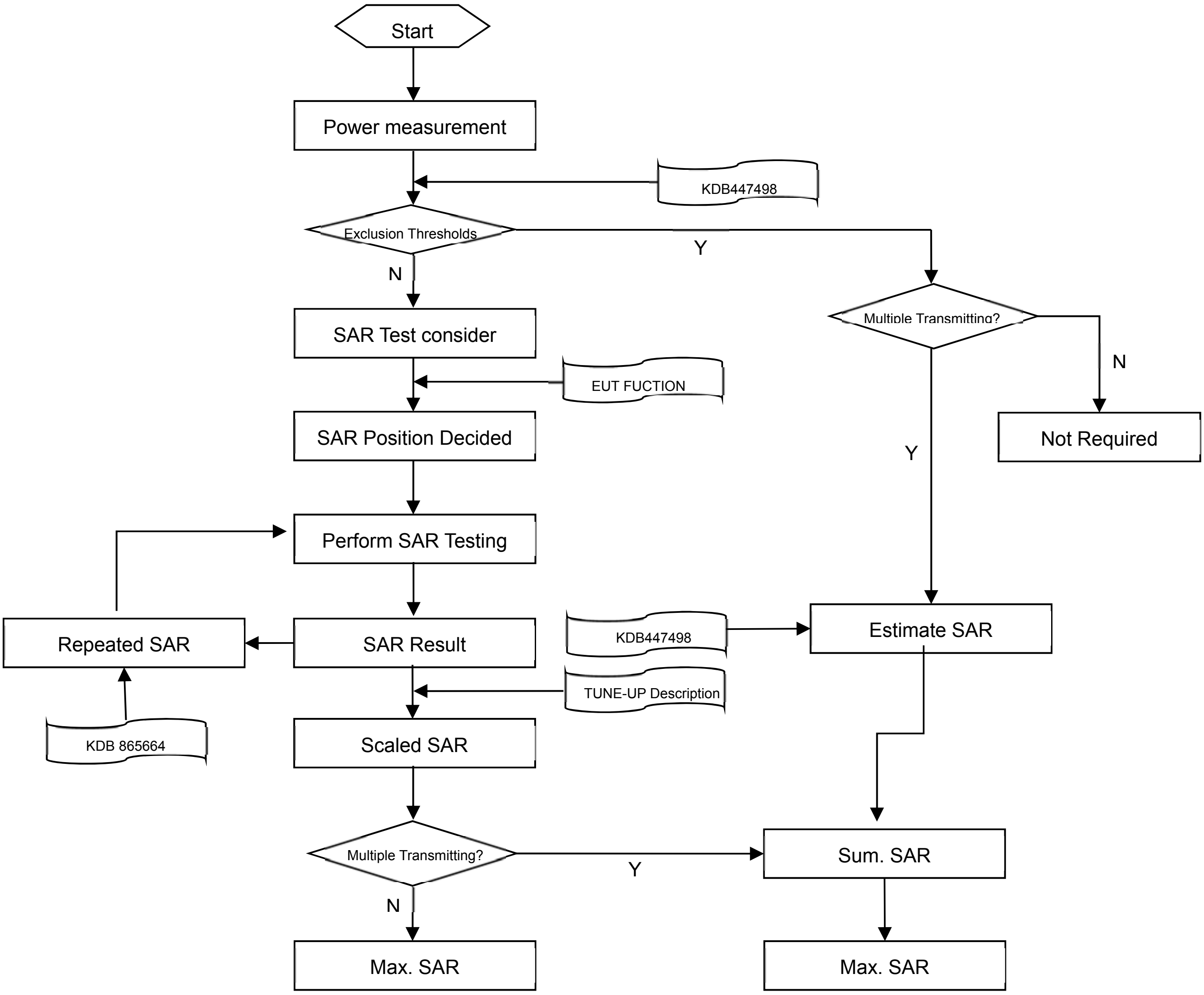


Fig Illustration for Lap-touching Position

7 SAR MEASUREMENT PROCEDURES

7.1 SAR Measurement Process Diagram



7.2 SAR Scan General Requirements

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013.

<table>
<tr><th colspan="3"></th><th>≤3GHz</th><th>>3GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5±1 mm</td><td>½·δ·ln(2)±0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30°±1°</td><td>20°±1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx Area , Δy Area</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3–4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx Zoom , Δy Zoom</td><td>≤ 2 GHz: ≤ 8 mm
2 –3 GHz: ≤ 5 mm*</td><td>3–4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="7">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2" rowspan="3">uniform grid: Δz Zoom (n)</td><td rowspan="3">≤ 5 mm</td><td>3–4 GHz: ≤ 4 mm</td></tr>
<tr><td>4–5 GHz: ≤ 3 mm</td></tr>
<tr><td>5–6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="4">graded grid</td><td rowspan="3">Δz Zoom (1): between 1st two points closest to phantom surface</td><td rowspan="3">≤ 4 mm</td><td>3–4 GHz: ≤ 3 mm</td></tr>
<tr><td>4–5 GHz: ≤ 2.5 mm</td></tr>
<tr><td>5–6 GHz: ≤ 2 mm</td></tr>
<tr><td>Δz Zoom (n>1): between subsequent points</td><td colspan="2">≤ 1.5·Δz Zoom (n-1)</td></tr>
<tr><td rowspan="3">Minimum zoom scan volume</td><td colspan="2" rowspan="3">x, y, z</td><td rowspan="3">≥30 mm</td><td>3–4 GHz: ≥ 28 mm</td></tr>
<tr><td>4–5 GHz: ≥ 25 mm</td></tr>
<tr><td>5–6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note:
1. δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
2. * When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

7.3 SAR Measurement Procedure

The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

7.4 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01 quoted below.
When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

8 CONDUCTED RF OUPUT POWER

8.1 WIFI

8.1.1 2.4GWIFI (8 Inches)

Band (GHz)	Mode	Channel	Freq. (MHz)	AV power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	15.22	16.00	Yes
		6	2437	**15.68**	16.00	Yes
		11	2462	14.62	16.00	Yes
	802.11g	1	2412	10.72	11.50	No
		6	2437	11.03	11.50	No
		11	2462	10.45	11.50	No
	802.11n(HT20)	1	2412	10.02	10.50	No
		6	2437	10.15	10.50	No
		11	2462	9.66	10.50	No
	802.11n(HT40)	3	2422	9.18	10.00	No
		6	2437	9.23	10.00	No
		9	2452	8.96	10.00	No
Note: According KDB 247228, when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, OFDM SAR test is not required. Adjusted SAR = 1.409* (14.13mW/39.81mW) = 0.500 W/Kg, so 2.4G OFDM SAR test is not required.						

8.1.2 2.4GWIFI (10.1 Inches)

Band (GHz)	Mode	Channel	Freq. (MHz)	AV power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	**14.54**	15.00	Yes
		6	2437	13.80	15.00	Yes
		11	2462	13.30	15.00	Yes
	802.11g	1	2412	10.64	11.50	No
		6	2437	11.01	11.50	No
		11	2462	10.47	11.50	No
	802.11n(HT20)	1	2412	9.86	10.50	No
		6	2437	9.42	10.50	No
		11	2462	9.83	10.50	No
	802.11n(HT40)	3	2422	10.30	11.00	No
		6	2437	9.65	11.00	No
		9	2452	9.35	11.00	No
Note: According KDB 247228, when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, OFDM SAR test is not required. Adjusted SAR = 1.078* (14.13mW/31.62mW) = 0.482 W/Kg, so 2.4G OFDM SAR test is not required.						

8.1.3 2.4GWIFI (11.5 Inches)

Band (GHz)	Mode	Channel	Freq. (MHz)	Conduted power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	**13.62**	14.00	Yes
		6	2437	13.24	14.00	Yes
		11	2462	13.41	14.00	Yes
	802.11g	1	2412	10.44	11.00	No
		6	2437	10.19	11.00	No
		11	2462	10.41	11.00	No
	802.11n(HT20)	1	2412	9.37	10.00	No
		6	2437	9.14	10.00	No
		11	2462	9.36	10.00	No
	802.11n(HT40)	3	2422	8.97	9.50	No
		6	2437	8.78	9.50	No
		9	2452	8.86	9.50	No

Note: According KDB 247228, when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, OFDM SAR test is not required.
Adjusted SAR = 0.915* (12.59mW/25.12mW) = 0.459 W/Kg, so 2.4G OFDM SAR test is not required.

8.2 Bluetooth (8 Inches)

Mode	GFSK			π/4-DQPSK		
Channel	0	39	78	0	39	78
Frequency (MHz)	2402	2441	2480	2402	2441	2480
Peak power (dBm)	4.26	4.36	4.32	5.67	5.70	5.65
Tune-up Power Limit (dBm)	5.00			6.00		
Mode	8-DPSK			BLE		
Channel	0	39	78	0	19	39
Frequency (MHz)	2402	2441	2480	2402	2440	2480
Peak power (dBm)	5.95	**6.00**	5.98	4.68	4.73	4.73
Tune-up Power Limit (dBm)	6.00			5.00		

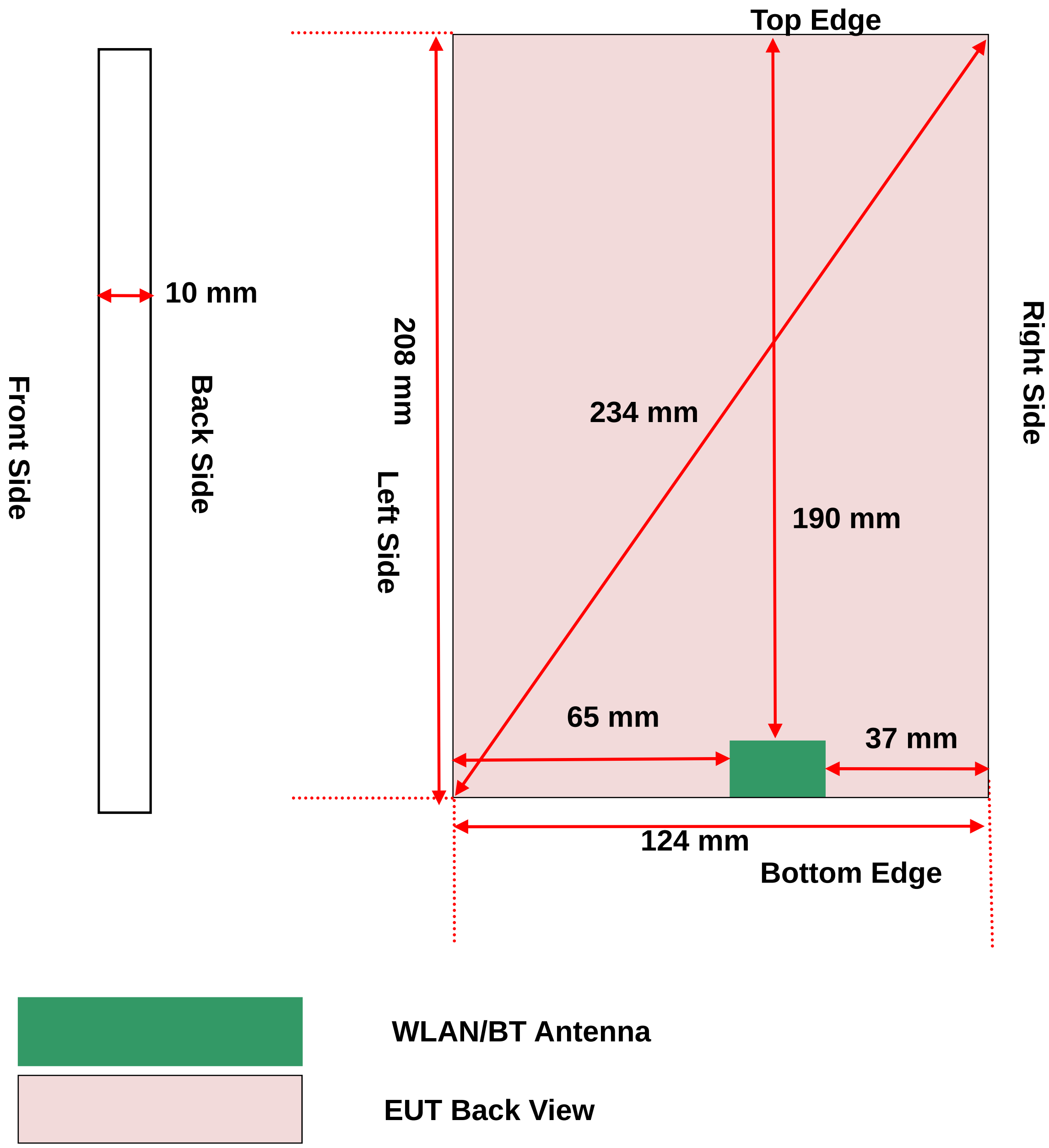
8.3 Bluetooth (10.1 Inches)

Mode	GFSK			π/4-DQPSK		
Channel	0	39	78	0	39	78
Frequency (MHz)	2402	2441	2480	2402	2441	2480
Peak power (dBm)	2.21	2.21	2.17	3.41	3.54	3.57
Tune-up Power Limit (dBm)	2.50			4.00		
Mode	8-DPSK			BLE		
Channel	0	39	78	0	19	39
Frequency (MHz)	2402	2441	2480	2402	2440	2480
Peak power (dBm)	3.61	3.72	**3.76**	1.83	1.95	1.96
Tune-up Power Limit (dBm)	4.00			2.00		

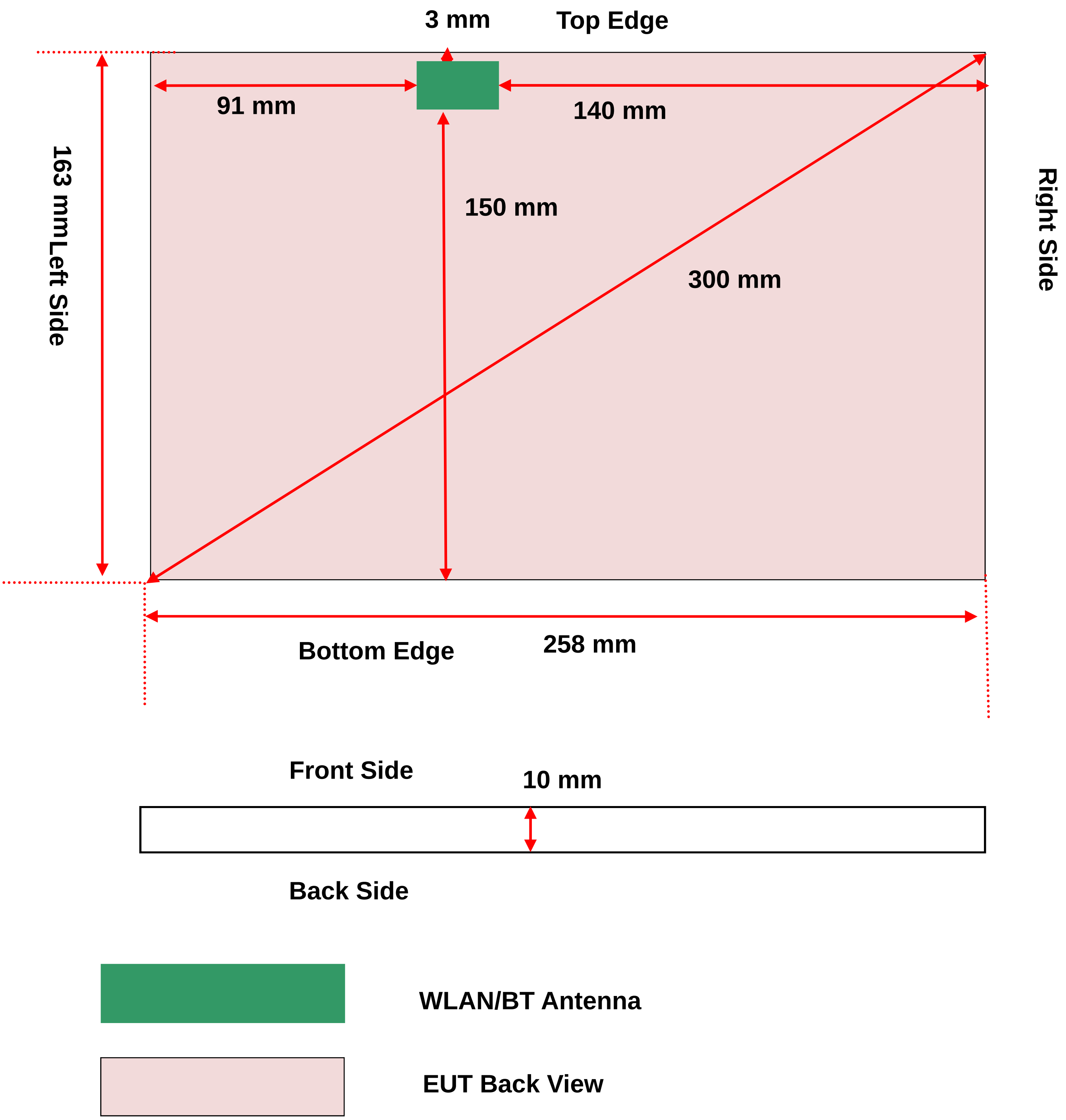
8.4 Bluetooth (11.5 Inches)

Mode	GFSK			π/4-DQPSK		
Channel	0	39	78	0	39	78
Frequency (MHz)	2402	2441	2480	2402	2441	2480
Conduted power (dBm)	2.77	3.34	3.63	4.36	4.92	5.29
Tune-up Power Limit (dBm)	4.00			5.50		
Mode	8-DPSK			BLE		
Channel	0	39	78	0	19	39
Frequency (MHz)	2402	2441	2480	2402	2440	2480
Conduted power (dBm)	4.68	5.22	**5.56**	4.79	5.22	5.40
Tune-up Power Limit (dBm)	6.00			5.50		

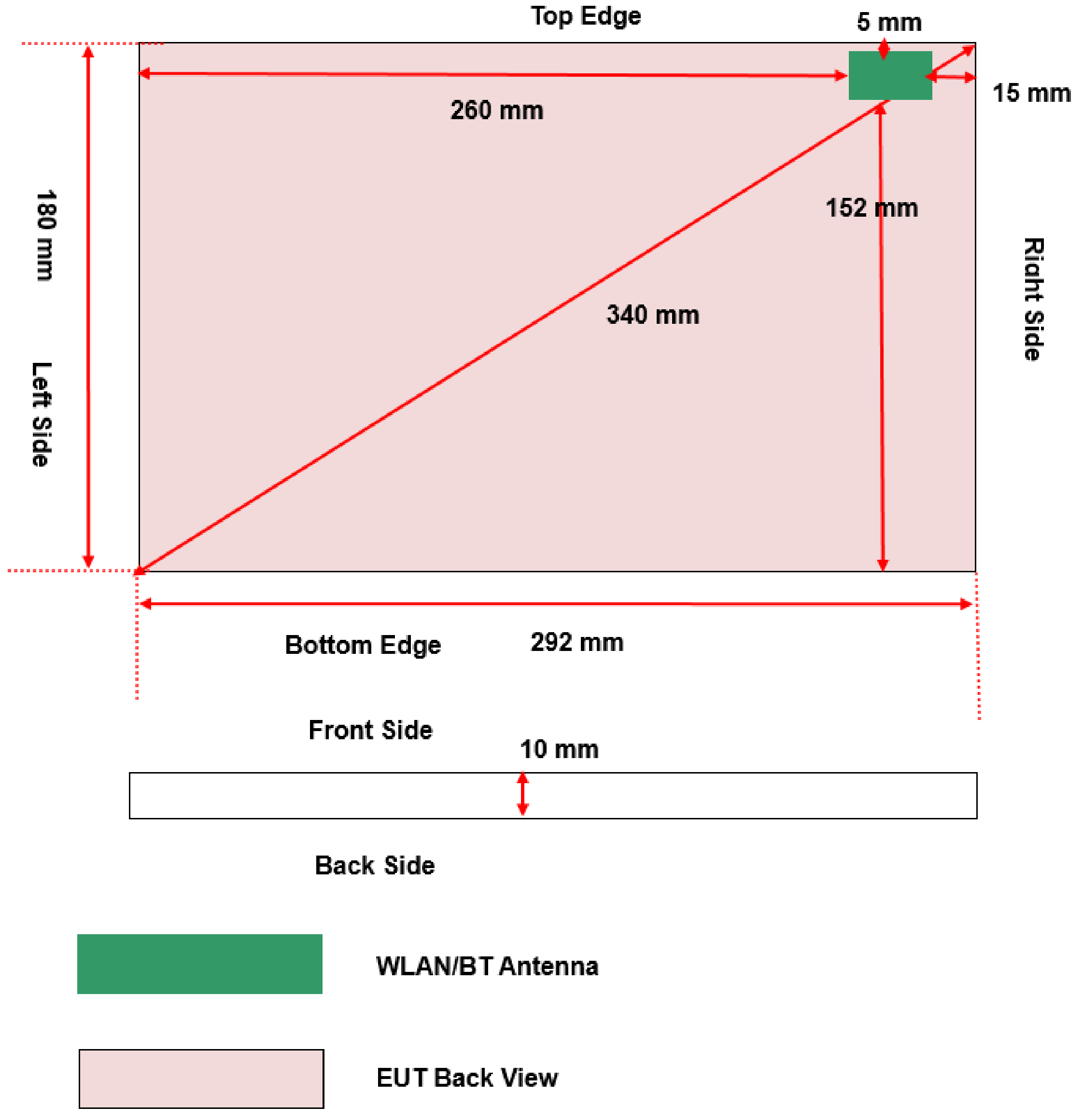
8.5 EUT ANTENNA LOCATION SKETCH (8 Inches)



8.6 EUT ANTENNA LOCATION SKETCH (10.1 Inches)



8.7 EUT ANTENNA LOCATION SKETCH (11.5 Inches)



8.8 SAR Test Exclusion Consider Table (8 Inches)

According with FCC KDB 447498 D01, Appendix A, <SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm> Table, this Device SAR test configurations consider as following :

Band	Mode	Max. Peak Power		Test Position Configurations				
		dBm	mW	Back Side	Left Edge	Right Edge	Top Edge	Bottom Edge
WLAN 2.4 G	Distance to User			<5mm	65mm	37mm	190mm	<5mm
	802.11b	16.00	39.81	Yes	No	No	No	Yes
	802.11g	11.50	14.13	No	No	No	No	No
	802.11n(HT20)	10.50	11.22	No	No	No	No	No
	802.11n(HT40)	10.00	10.00	No	No	No	No	No
Bluetooth	Distance to User			<5mm	65mm	37mm	190mm	<5mm
	BT	6.00	3.98	No	No	No	No	No

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units
2. Per KDB 447498 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D01, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   a. f(GHz) is the RF channel transmit frequency in GHz
   b. Power and distance are rounded to the nearest mW and mm before calculation
   c. The result is rounded to one decimal place for comparison
   d. For < 50 mm distance, we just calculate mW of the exclusion threshold value (3.0) to do compare.
   This formula is [3.0] / [√f(GHz)] ·[(min. test separation distance, mm)] = exclusion threshold of mW.
5. Per KDB 447498 D01, at 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following
   a. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
6. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA /HSUPA /DC-HSDPA output power is < 0.25dB higher than RMC12.2Kbps, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.
7. Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
   a. When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
   b. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

8.9 SAR Test Exclusion Consider Table (10.1 Inches)

According with FCC KDB 447498 D01, Appendix A, <SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm> Table, this Device SAR test configurations consider as following :

Band	Mode	Max. Peak Power		Test Position Configurations				
		dBm	mW	Back Side	Left Edge	Right Edge	Top Edge	Bottom Edge
WLAN 2.4 G	Distance to User			<5mm	91mm	140mm	<5mm	150mm
	802.11b	15.00	31.62	Yes	No	No	Yes	No
	802.11g	11.50	14.13	No	No	No	No	No
	802.11n(HT20)	10.50	11.22	No	No	No	No	No
	802.11n(HT40)	11.00	12.59	No	No	No	No	No
Bluetooth	Distance to User			<5mm	65mm	37mm	190mm	<5mm
	BT	4.00	2.51	No	No	No	No	No

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units
2. Per KDB 447498 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D01, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   e. f(GHz) is the RF channel transmit frequency in GHz
   f. Power and distance are rounded to the nearest mW and mm before calculation
   g. The result is rounded to one decimal place for comparison
   h. For < 50 mm distance, we just calculate mW of the exclusion threshold value (3.0) to do compare.
   This formula is [3.0] / [√f(GHz)] ·[(min. test separation distance, mm)] = exclusion threshold of mW.
5. Per KDB 447498 D01, at 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following
   c. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   d. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
6. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA /HSUPA /DC-HSDPA output power is < 0.25dB higher than RMC12.2Kbps, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.
7. Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
   c. When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
   d. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

8.10 SAR Test Exclusion Consider Table (11.5 Inches)

According with FCC KDB 447498 D01, Appendix A, <SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm> Table, this Device SAR test configurations consider as following :

Band	Mode	Max. Peak Power		Test Position Configurations				
		dBm	mW	Back Side	Left Edge	Right Edge	Top Edge	Bottom Edge
WLAN 2.4 G	Distance to User			<5mm	260mm	15mm	5mm	152mm
	802.11b	14.00	25.12	Yes	No	No	Yes	No
	802.11g	11.00	11.22	No	No	No	No	No
	802.11n(HT20)	10.00	12.59	No	No	No	No	No
	802.11n(HT40)	9.50	8.91	No	No	No	No	No
Bluetooth	Distance to User			<5mm	260mm	15mm	5mm	152mm
	BT	6.00	3.98	No	No	No	No	No

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units
2. Per KDB 447498 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D01, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   i. f(GHz) is the RF channel transmit frequency in GHz
   j. Power and distance are rounded to the nearest mW and mm before calculation
   k. The result is rounded to one decimal place for comparison
   l. For < 50 mm distance, we just calculate mW of the exclusion threshold value (3.0) to do compare.
   This formula is [3.0] / [√f(GHz)] ·[(min. test separation distance, mm)] = exclusion threshold of mW.
5. Per KDB 447498 D01, at 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following
   e. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   f. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
6. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA /HSUPA /DC-HSDPA output power is < 0.25dB higher than RMC12.2Kbps, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.
7. Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
   e. When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
   f. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

9 TEST RESULTS

9.1 WIFI 2.4GHz (8 Inches)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Duty cycle(%)	Duty Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Body													
802.11 b	Back Side	0	6	2437	-0.51	0.873	15.68	16.00	1.076	98.1	1.019	0.958	/
		0	1	2412	-2.42	0.797	15.22	16.00	1.197	98.1	1.019	0.972	/
		0	11	2462	-0.05	1.006	14.62	16.00	1.374	98.1	1.019	**1.409**	1#
	Bottom Edge	0	6	2437	-3.54	0.679	15.68	16.00	1.076	98.1	1.019	0.745	/

9.2 WIFI 2.4GHz (10.1 Inches)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Duty cycle(%)	Duty Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Body													
802.11 b	Back Side	0	1	2412	-1.15	0.707	14.54	15.00	1.112	97.81	1.022	0.804	/
		0	6	2437	-2.91	0.707	13.80	15.00	1.318	97.81	1.022	0.953	/
		0	11	2462	-1.62	0.713	13.30	15.00	1.479	97.81	1.022	**1.078**	2#
	Top Edge	0	1	2412	-3.79	0.238	14.54	15.00	1.112	97.81	1.022	0.271	/

9.3 WIFI 2.4GHz (11.5 Inches)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Duty cycle(%)	Duty Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Body													
802.11 b	Back Side	0	1	2412	-0.12	0.795	13.62	14.00	1.091	98.28	1.018	0.883	/
		0	6	2437	-3.42	0.755	13.24	14.00	1.191	98.28	1.018	**0.915**	3#
		0	11	2462	-2.15	0.739	13.41	14.00	1.146	98.28	1.018	0.861	/
	Top Edge	0	1	2412	-0.17	0.179	13.62	14.00	1.091	98.28	1.018	0.199	/

10 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. If the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20, or when the original or repeated measurement is >= 1.45 W/kg, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

Frequency Band (MHz)	Wireless Band	RF Exposure Conditions	Test Position	Highest Measured SAR (W/kg)	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Largest to Smallest SAR Radio
2400 (8 Inches)	WIFI 802.11 b	Body	Back Side	1.006	Yes	0.998	1.01
Note: The ratio of largest to smallest SAR for the original and first repeated measurements is < 1.20, the second repeated measurement is not required.							

11 SIMULTANEOUS TRANSMISSION

Note: This product has only one antenna for WLAN and Bluetooth, WLAN and Bluetooth antenna can't simultaneous transmission at same time, so simultaneous transmission evaluation is not require.

12 TEST EQUIPMENTS LIST

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
2450MHz Dipole	SATIMO	SID 2450	S/N 11/17 DIP 2G450-452	2017/03/22	2020/03/21
E-Field Probe	MVG	SSE2	S/N 34/15 EPGO 265	2019/03/19	2020/03/18
MultiMeter	Keithley	MultiMeter 2000	4024022	2019/06/17	2020/06/16
Signal Generator	R&S	SMBV100A	260592	2019/06/13	2020/06/12
Power Meter	Agilent	E4419B	GB40201833	2018/11/01	2019/10/31
Power Sensor	Agilent	E9300A	MY41498012	2018/11/01	2019/10/31
Power Sensor	Agilent	E9300A	MY41499891	2018/11/01	2019/10/31
Network Analyzer	R&S	ZVL-6	101380	2019/06/20	2020/06/19
Thermometer	Elitech	RC-4HC	N/A	2018/11/05	2019/11/04
Power Amplifier	SATIMO	6552B	22374	N/A	N/A
Dielectric Probe Kit	SATIMO	SCLMP	SN 25/13 OCPG56	N/A	N/A
Antenna	SATIMO	ANTA3	SN 17/13 ZNTA45	N/A	N/A
Phantom1	SATIMO	SAM	SN 11/17 SAM133	N/A	N/A
Phantom2	SATIMO	ELLI	SN 11/17 ELLI42	N/A	N/A
Attenuator	COM-MW	ZA-S1-31	1305003187	N/A	N/A
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

Note: Per KDB 865664 Dipole SAR Validation Verification, BALUN LAB has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss in within 20% of calibrated measurement.
4. Impedance (real or imaginary parts) in within 5 Ohms of calibrated measurement.

ANNEX A SIMULATING LIQUID VERIFICATION RESULT

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an SCLMP Dielectric Probe Kit.

According to 2019 TCB workshop, FCC accept SAR testing with IEC tissue parameters for body, so this product only used IEC tissue parameters to perform SAR testing.

8 Inches & 10.1 Inches

Date	Liquid Type	Fre. (MHz)	Temp. (℃)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ε)	Target Conductivity (σ) (S/m)	Target Permittivity (ε)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2019.08.28	Head	2450	21.3	1.77	39.21	1.80	39.20	-1.67	0.03
Note: The tolerance limit of Conductivity and Permittivity is± 5%.									

11.5 Inches

Date	Liquid Type	Fre. (MHz)	Temp. (℃)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ε)	Target Conductivity (σ) (S/m)	Target Permittivity (ε)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2019.09.05	Head	2450	21.2	1.80	38.96	1.80	39.20	0.00	-0.61
Note: The tolerance limit of Conductivity and Permittivity is± 5%.									

ANNEX B SYSTEM CHECK RESULT

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10%(for 1 g).

8 Inches & 10.1 Inches

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)	Targeted SAR(W/kg)	Tolerance (%)
2019.08.28	Head	2450	100	5.203	52.03	54.31	-4.20	52.40	-0.71
Note: The tolerance limit of System validation ±10%.									

11.5 Inches

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)	Targeted SAR(W/kg)	Tolerance (%)
2019.09.05	Head	2450	100	5.111	51.11	54.31	-5.89	52.40	-2.46
Note: The tolerance limit of System validation ±10%.									

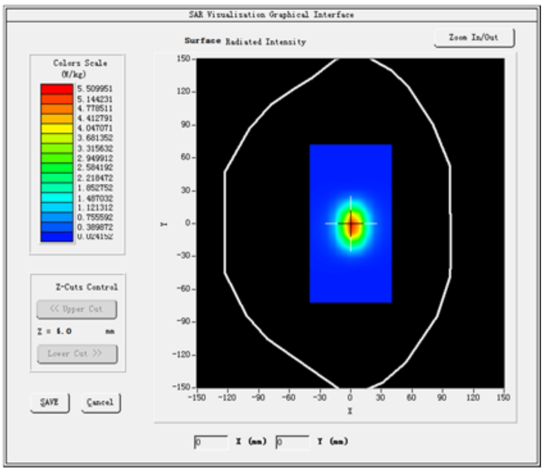
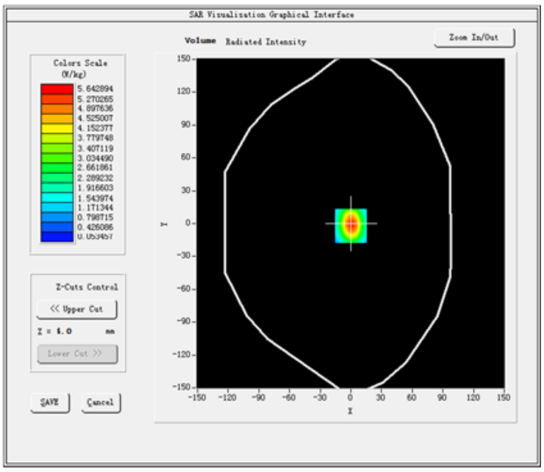
System Performance Check Data(2450MHz)

8 Inches & 10.1 Inches

Type: Phone measurement (Complete)
E-Field Probe: SN 34/15 SSE2 EPGO265
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2019.08.28
Measurement duration: 18 minutes 21 seconds

Experimental conditions.

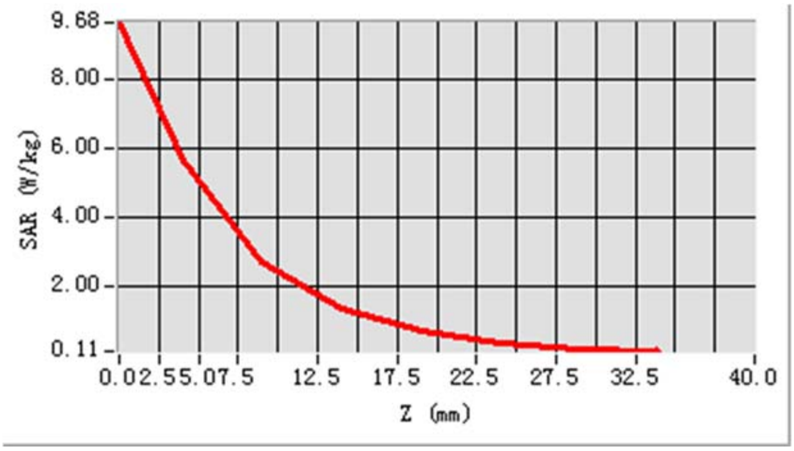
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	2450MHz
Signal	CW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	39.214900
Conductivity (S/m)	1.773461
Power drift (%)	-0.970000
Ambient Temperature:	22.8°C
Liquid Temperature:	21.3°C
ConvF:	2.55
Crest factor:	1:1

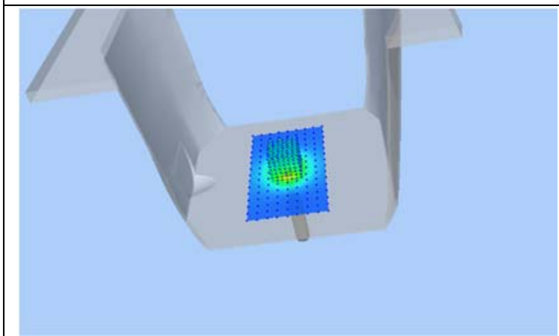
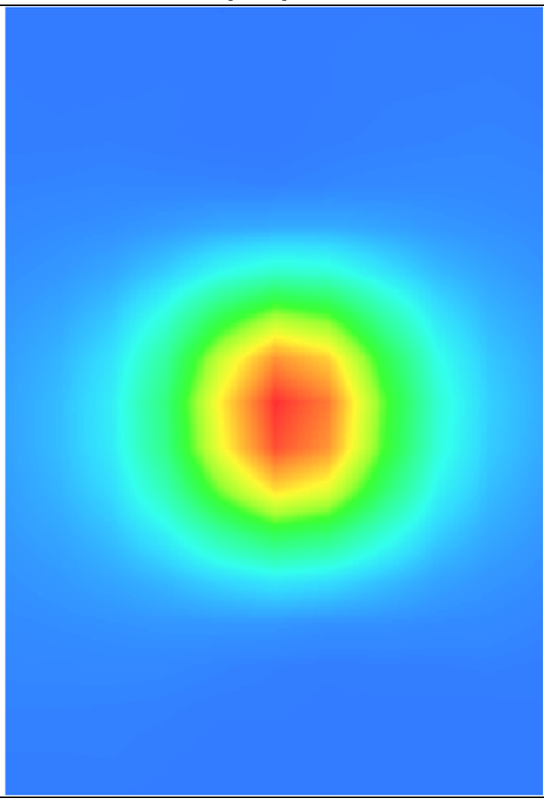
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=-2.00
SAR Peak: 9.58 W/kg

SAR 10g (W/Kg)	2.372915
SAR 1g (W/Kg)	5.202994

Z Axis Scan



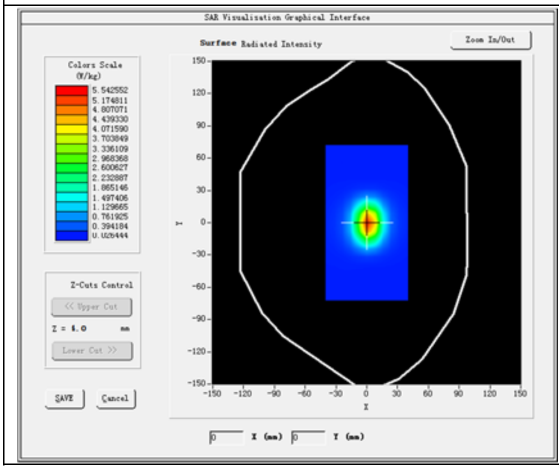
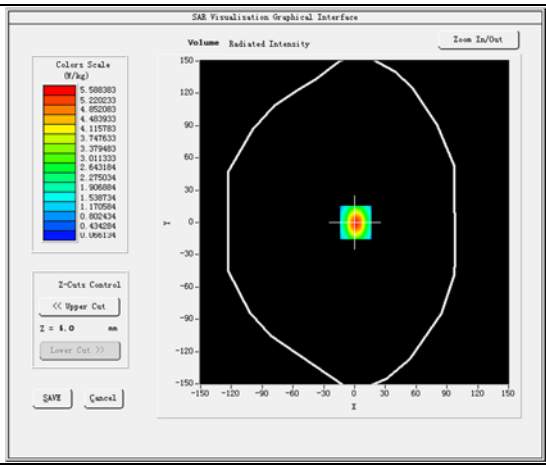
3D screen shot	Hot spot position
	

11.5 Inches

Type: Phone measurement (Complete)
E-Field Probe: SN 34/15 SSE2 EPGO265
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2019.09.05
Measurement duration: 18 minutes 40 seconds

Experimental conditions.

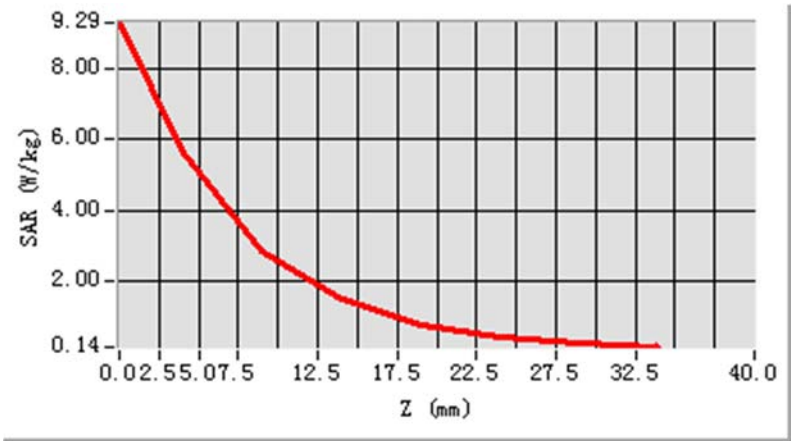
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	2450MHz
Signal	CW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	38.958732
Conductivity (S/m)	1.801901
Power drift (%)	-0.620000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	2.55
Crest factor:	1:1

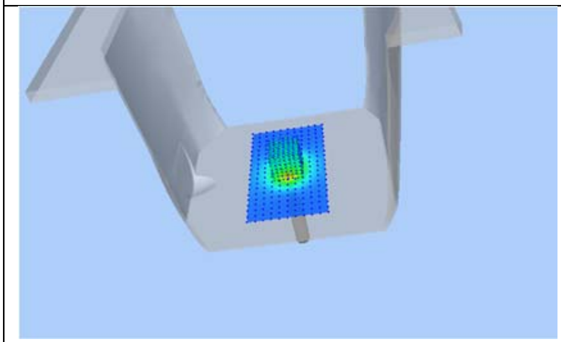
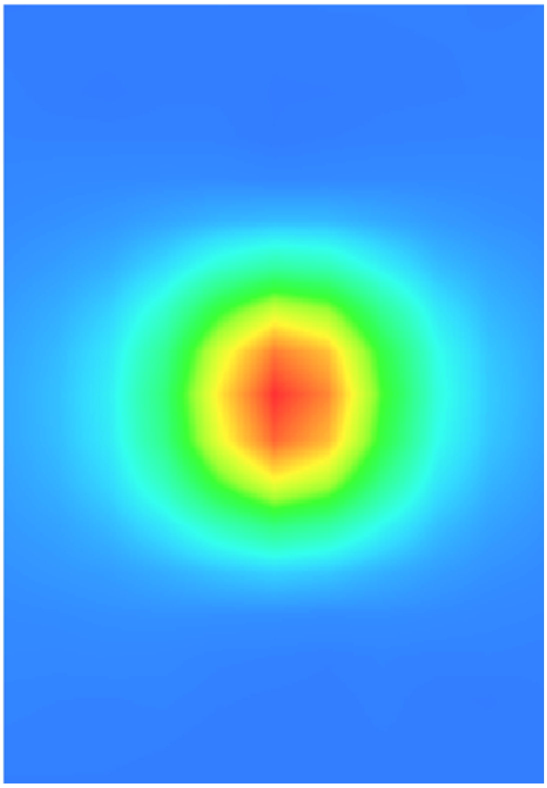
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=0.00
SAR Peak: 9.20 W/kg

SAR 10g (W/Kg)	2.391223
SAR 1g (W/Kg)	5.110526

Z Axis Scan



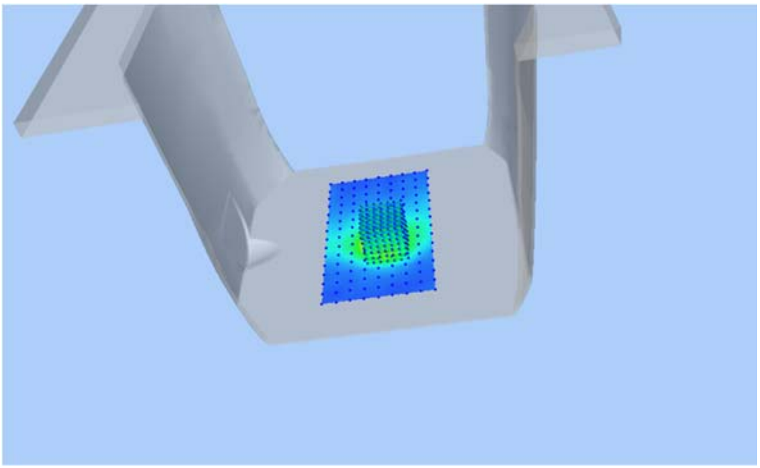
3D screen shot	Hot spot position
	

ANNEX C TEST DATA

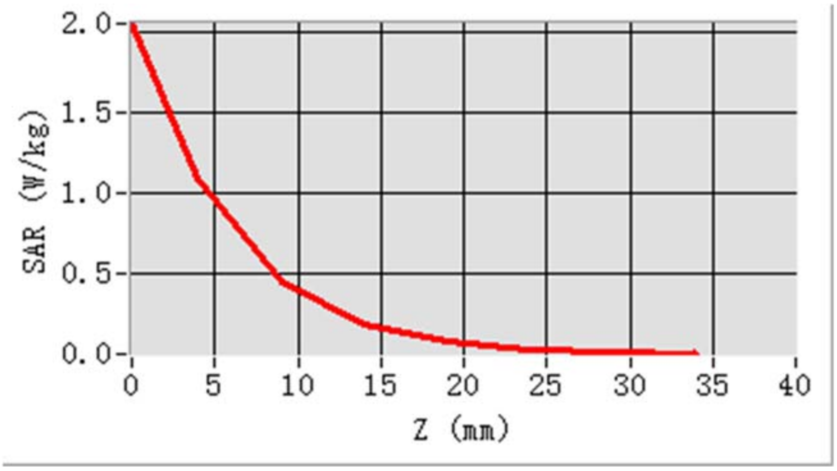
8 Inches

MEAS. 1 Body Plane with Back Side 0mm on High Channel in IEEE 802 b mode

Test Date:	28/8/2019
Measurement duration:	16 minutes 48 seconds
Signal:	WLAN, f=2462.0 MHz, Duty Cycle: 1:1.019
Liquid Parameters:	Permittivity: 38.95; Conductivity: 1.79 S/m
Test condition:	Ambient Temperature: 22.8°C, Liquid Temperature: 21.3°C
Probe:	SN 34/15 SSE2 EPGO265, ConvF: 2.55
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	7x7x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=30.000000, Y=-22.000000
SAR 10g (W/Kg):	0.398556
SAR 1g (W/Kg):	1.005875
Power drift (%):	-0.05
3D screen shot	



Z Axis Scan

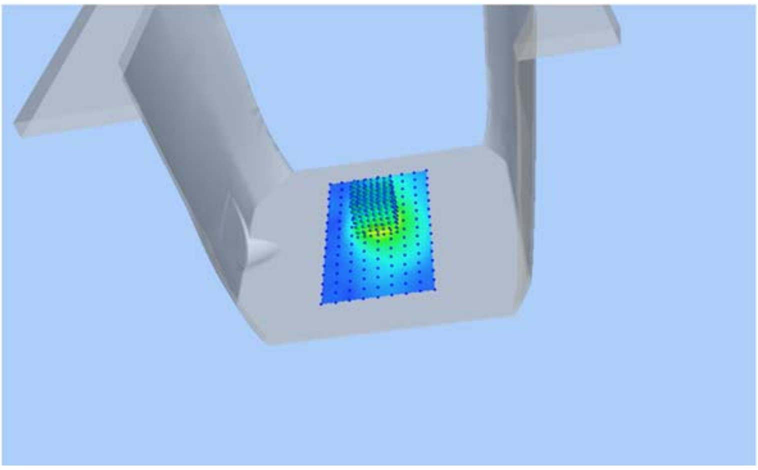


10.1 Inches

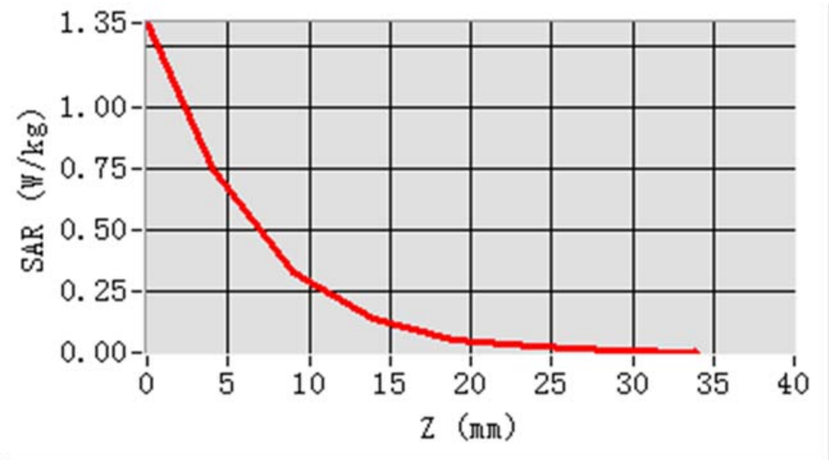
MEAS. 2 Body Plane with Back Side 0mm on High Channel in IEEE 802 b mode

Test Date:	28/8/2019
Measurement duration:	16 minutes 36 seconds
Signal:	WLAN, f=2462.0 MHz, Duty Cycle: 1:1.022
Liquid Parameters:	Permittivity: 38.95; Conductivity: 1.79 S/m
Test condition:	Ambient Temperature: 22.8°C, Liquid Temperature: 21.3°C
Probe:	SN 34/15 SSE2 EPGO265, ConvF: 2.55
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	7x7x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=0.000000, Y=8.000000
SAR 10g (W/Kg):	0.298055
SAR 1g (W/Kg):	0.712545
Power drift (%):	-1.62

3D screen shot



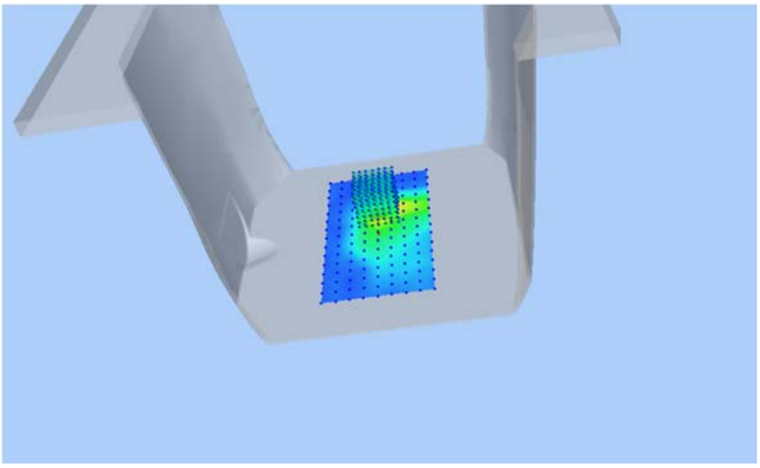
Z Axis Scan



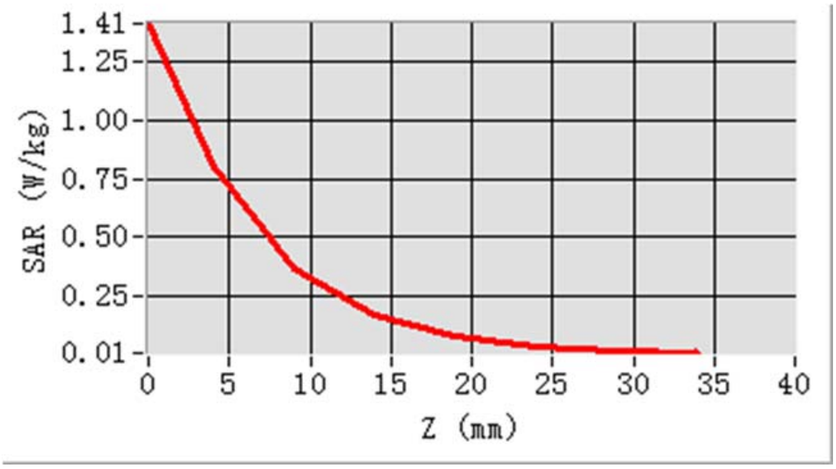
11.5 Inches

MEAS. 3 Body Plane with Back Side 0mm on Middle Channel in IEEE 802 b mode

Test Date:	5/9/2019
Measurement duration:	16 minutes 36 seconds
Signal:	WLAN, f=2437.0 MHz, Duty Cycle: 1:1.018
Liquid Parameters:	Permittivity: 39.22; Conductivity: 1.79 S/m
Test condition:	Ambient Temperature: 22.6°C, Liquid Temperature: 21.2°C
Probe:	SN 34/15 SSE2 EPGO265, ConvF: 2.55
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	7x7x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=0.000000, Y=18.000000
SAR 10g (W/Kg):	0.316127
SAR 1g (W/Kg):	0.754866
Power drift (%):	-3.42
3D screen shot	



Z Axis Scan



ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ1970050-AW.pdf”.

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document “BL-SZ1970050-AS.pdf”.

ANNEX F CALIBRATION REPORT

Please refer the document “CALIBRATION REPORT.pdf”.

--END OF REPORT--